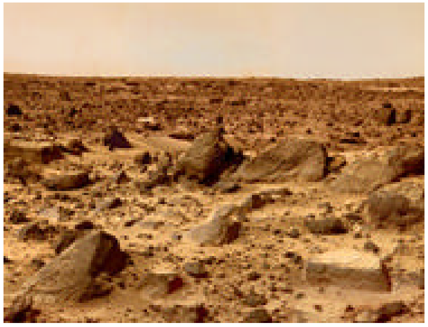
Canberra Deep Space Communication Complex

Planetary Encounters Excursion Booklet

Introduction.

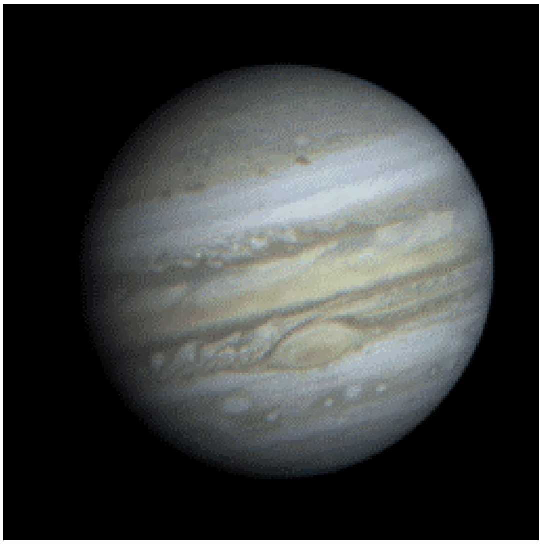
The tasks and activities that are included in this kit, along with the student worksheet, are designed to introduce students to some basic features and characteristics of the solar system, and also to the means with which human beings have ventured off of the Earth to explore the solar system.

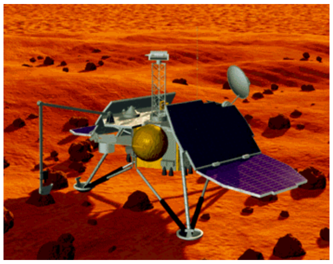
In Task 1, students simply use the information contained in the visitor centre to describe some characteristics of the planets in the solar system. This task helps to familiarise students with the physical differences between the planets.


Martian Landscape

Task 2 asks students to use the “How old are you” exhibit to find out what their age would be on other planets (in terms of our Earthly convention). Here, students learn that a “year” is how long it takes for a planet to go around the sun once, and subsequently, that the farther from the sun a planet is, the longer it takes to go around the sun, and hence, the longer its year. This Task therefore, incorporates notions of distance and time into the classroom. For a more mathematically oriented class, the ages of students can also be calculated manually using the information in these notes -- as well as information on the lengths of planets’ years found in the centre.

In Task 3, students use the "Turbulent Orb" exhibit to demonstrate the relationship between a planet's spin and its atmosphere. This is particularly useful for demonstrating patterns in the atmospheres of Gas Giant Planets. Students compare the pictures of the planets with the 3-Dimensional simulation. The model also illustrates how gaseous atmospheres behave as fluids. In addition to this, this activity can be used in an artistic capacity as well, to describe patterns in nature, perhaps.


Jupiter and its swirling clouds


Mars Polar Lander

Task 4, relates well to Task 1 in that it asks students to match a planet with an appropriate means for exploring that planet (ie. orbiting spacecraft, lander, rover, etc.). The physical characteristics of a planet dictate which exploration means are possible to use.

Last, in Task 5, students are asked to determine the distance between planets. This Task is therefore related to Task 2 in terms of revealing the relative positions of the planets. One important note to add, though the relative distances can be determined, the actual visual scale of the solar system is not dealt with in this task. Instead, the notion of scale is dealt with in the activities section, especially with those activities that involve the construction of scale solar system models.

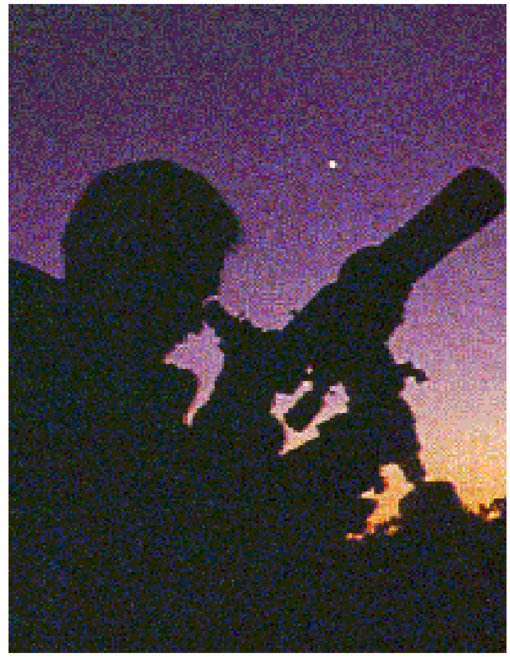

Voyager and the Gas Gaints

At the end of these notes you will also find activities that you can try in the classroom. These activities are intended to supplement the worksheets, and involve students and teachers alike in the hands on investigation of space and spaceflight.

As these notes and worksheets are new to Tidbinbilla, we are eager to get your feedback on the educational value and quality of the packages. For this reason, if you or your colleagues can offer any advice or feedback (what you liked as well as what you did not like), please feel free to let us know. It is only through your thoughtful consideration of the packages, and your input, that we can hope ultimately to create a high quality and educationally sound visit experience.

Thank You
Darren Osborne
Public Relations Manager

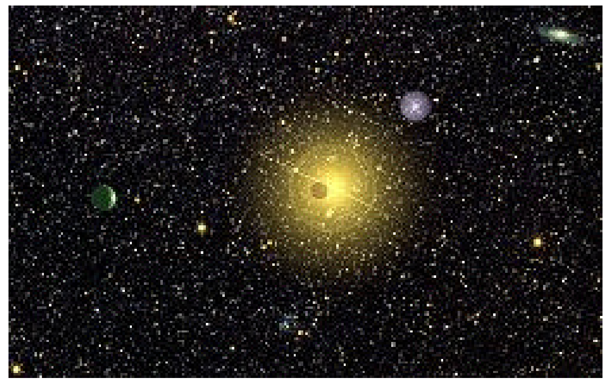
The Solar System in our backyard



Human beings have known about some of the planets in our solar system for thousands of years. In fact, people in ancient Greece who watched some of those bright stars silently changing their positions in the skies, named the wandering stars planets. Observant and persistent Greek sky-watchers noticed five such wandering stars: Mercury, Venus, Mars, Jupiter, and Saturn. The remaining three (Uranus, Neptune, and Pluto) were too faint to be seen without the aid of telescopes. Thus they were not discovered until the 18th, 19th and 20th centuries.

Today we know that there are nine planets in our solar system: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto. They come in two distinct types: solid rocky planets, and gas giants. The inner four planets and distant Pluto are rocky, or terrestrial planets, whereas, Jupiter, Saturn, Uranus, and Neptune are all gas giants. Why the planets are differentiated in this way, indeed why planets exist at all, is explained in formation of a Solar System in the Appendix.

Up until very recently, the planets in our solar system were the only ones known to exist in the entire universe. The fact that astronomers hadn't found other planets around other stars was a sobering prospect especially given the seemingly natural process that is believed to create planets. Surely we couldn't reside in the only solar system in existence! In the last few years however, astronomers believe that they have successfully detected planets in orbit around other stars. “Detection” is different from “seeing”. How astronomers have managed to “detect” planets beyond our own solar system is also treated in “If we can’t see it how do we know it’s there?” in the Appendix.


Artists impression of our Solar System

Beyond detecting the existence of these “extrasolar” planets, very little else is known about them. One thing we do know about them is that they are far from hospitable places. This means that for now, the Earth remains the only home we will ever have. Sending a probe to look at the new-found planets close-up is beyond the current capabilities of space science, but perhaps some time in the future we will explore planets in other solar systems, just as we have explored our own.